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**Golder
Associates**

Site: West Lake Landfill
ID#: NRD079900932
Break: 109 out#2
Other: Wackysland
4-18-95

**REMEDIAL INVESTIGATION/FEASIBILITY STUDY
WORK PLAN**

0714

APPENDIX B

SITE HEALTH AND SAFETY PLAN

RECEIVED

**WEST LAKE LANDFILL
OPERABLE UNIT 2
BRIDGETON, MISSOURI**

APR 18 1995

**SPFD BRANCH
REGION VII**

Prepared For:

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West Lake Landfill
c/o Bridgeton Sanitary Landfill
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**OU-2 RI/FS WORK PLAN
APPENDIX B
SITE HEALTH AND SAFETY PLAN**

April 1995

i

Rev. 0
943-2848

TABLE OF CONTENTS

	<u>Page</u>
1.0 INTRODUCTION	1
1.1 General Considerations	1
1.2 Safety Personnel and Chain of Command	2
1.3 Medical Surveillance and Training	3
1.4 Respiratory Protection	4
1.6 Site Control Procedures	5
1.7 Site Safety Briefing	6
2.0 PROJECT DESCRIPTION	7
2.1 Project Objective	7
2.2 Background Information	7
2.3 Health and Safety Plan Applicability	10
3.0 SCOPE OF WORK AND POTENTIAL HAZARDS	11
3.1 Work Tasks	11
3.2 Potential Hazards	12
3.3 Assessment and Mitigation of Potential Hazards	12
3.3.1 Inhalation	12
3.3.2 Absorption	13
3.3.3 Ingestion	13
3.3.4 Injury From Falling Objects	13
3.3.5 Hearing Loss	13
3.3.6 Weather Related Stress	14
3.3.6.1 Cold Stress	14
3.3.6.2 Heat Stress	15
4.0 SITE MONITORING AND ACTION LEVELS	17
4.1 Combustible Gases	18
4.2 Hydrogen Sulfide and Hydrogen Cyanide	20
4.3 Volatile Organic Compound Monitoring	22
4.4 Radionuclides	23

**OU-2 RI/FS WORK PLAN
APPENDIX B
SITE HEALTH AND SAFETY PLAN**

April 1995

ii

Rev. 0
943-2848

TABLE OF CONTENTS--continued

	<u>Page</u>
5.0 PERSONAL PROTECTIVE CLOTHING AND RESPIRATORY PROTECTION	25
5.1 Personal Protective Equipment	25
5.2 Levels of Protection for RI Field Tasks	25
5.2.1 Surficial Geologic Investigation	25
5.2.2 Piezometer/Monitoring Borehole Drilling and Well Construction . .	26
5.2.3 Groundwater Sample Collection	26
5.2.4 Surface Water/Sediment Sampling	26
5.2.5 Surface Soil Sample Collection	26
5.2.6 Leachate Riser Borehole Drilling, Well Construction, and Sampling	27
5.2.7 Landfill Gas and Soil Gas Sample Collection	27
5.2.8 Aquifer Testing	27
5.2.9 Other Tasks	27
6.0 SITE CONTROL	28
7.0 DECONTAMINATION PROCEDURES	29
7.1 Equipment Decontamination	29
7.2 Personnel Decontamination	29
7.3 Respiratory Protection Equipment Decontamination	30
7.4 Heavy Equipment Decontamination	30
8.0 CONTINGENCY AND EMERGENCY RESPONSE PLANS	31
8.1 Medical Emergency Response Plan	32
8.2 Fire and Explosions	33
8.3 Unforeseen Circumstances	34

**OU-2 RI/FS WORK PLAN
APPENDIX B
SITE HEALTH AND SAFETY PLAN**

April 1995

iii

Rev. 0
943-2848

TABLE OF CONTENTS--continued

LIST OF TABLES

Table 1-1	OU-2 RI/FS Contractor Health and Safety Personnel and Chain of Command
Table 2-1	Chemical Compounds Potentially Present On-site
Table 3-1	Wind Chill Factors
Table 4-1	Action Levels
Table 5-1	PPE Requirements, per Task

LIST OF FIGURES

Figure 2-1	Site Features Map
Figure 8-1	Route to Hospital

LIST OF ATTACHMENTS

Attachment A	Equipment Decontamination Protocol
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**OU-2 RI/FS WORK PLAN
APPENDIX B
SITE HEALTH AND SAFETY PLAN**

April 1995

1

Rev. 0
943-2848

1.0 INTRODUCTION

This document is the Site Health and Safety Plan (HSP) for the Operable Unit 2 (OU-2) Remedial Investigation/Feasibility Study (RI/FS) at the West Lake Landfill. This HSP has been developed by Golder Associates Inc. (Golder), the OU-2 RI/FS contractor, for the exclusive use by the contractor and its subcontractors.

The purpose of this document is to establish standard health and safety procedures for the OU-2 RI/FS contractor and subcontractor employees during OU-2 RI/FS field activities at the West Lake Landfill, Bridgeton, Missouri. The provisions of this plan apply to all RI/FS contractor and subcontractor employees involved in the field activities with the potential for exposure to hazardous materials or activities.

The following paragraphs of Section 1 of the HSP outline general health and safety considerations to be utilized when conducting field activities for the OU-2 RI/FS. Section 2 describes the project; Section 3 details the scope of work and potential hazards. Site monitoring and action levels are presented in Section 4. Section 5 describes personal protective equipment and respiratory protection to be used at this site. Section 6 presents site control requirements. Decontamination procedures are described in Section 7. Contingency and emergency response plans are presented in Section 8. References utilized in developing this HSP are listed in Section 9. Documents listed are incorporated by reference and are present in the on-site Golder office.

1.1 General Considerations

The levels of protection and the procedures specified in this HSP are based on the best information available at this time, and represent the minimum health and safety requirements to be observed by all OU-2 RI/FS contractor and subcontractor employees while engaged in this

**OU-2 RI/FS WORK PLAN
APPENDIX B
SITE HEALTH AND SAFETY PLAN**

April 1995

2

Rev. 0
943-2848

project. Unforeseeable site conditions may warrant the use of higher levels of protection. Any additional health and safety procedures that are required by the owner/operator of the West Lake Landfill that are more stringent than those specified herein must be followed and will supersede the requirements of this plan. Additionally, the content of this HSP may change or undergo revision as additional information is obtained during the RI. Any changes to this HSP must be reviewed by Golder Health and Safety personnel, and are subject to approval by the Golder Project Manager.

The safety of all on-site personnel is ultimately the responsibility of each employee and his or her respective employer. Subcontractors are required to provide the necessary safety equipment, medical monitoring, and safety training to their personnel in compliance with the Occupational Safety and Health Administration (OSHA) regulations provided in 29 CFR 1910.120. Subcontractors will submit verification of each employee's level of safety training, participation in a medical monitoring program, and a copy of current respirator fit-test records.

Field personnel must read this document carefully. If you have any questions or concerns which you feel are not adequately addressed, ask the RI/FS contractor Health and Safety Officer or available on-site Health and Safety Personnel. Follow the designated health and safety procedures, be alert to the hazards associated with working on any construction site in close proximity to heavy equipment, and above all else, use common sense and exercise reasonable caution at all times.

1.2 Safety Personnel and Chain of Command

OU-2 RI/FS contractor personnel responsible for health and safety on this project will include the Project Health and Safety Officer, the Site Health and Safety Officer, and the Project Manager. The Project Health and Safety Officer will have overall responsibility for establishing appropriate health and safety procedures for the project (as presented in this Health and Safety

**OU-2 RI/FS WORK PLAN
APPENDIX B
SITE HEALTH AND SAFETY PLAN**

April 1995

3

Rev. 0
943-2848

Plan) and shall have the authority to implement those procedures including, if necessary, the authority to temporarily shut down the project for health and safety reasons. The Site Health and Safety Officer will be responsible for assuring that the procedures designated in this Health and Safety Plan are implemented in the field. The Project Manager will have overall responsibility for project health and safety and has the authority to take whatever actions may be necessary to provide a safe working environment for all OU-2 RI/FS contractor and subcontractor personnel. The personnel fulfilling these responsibilities are listed in Table 1-1.

As discussed above, the ultimate responsibility for the health and safety of the individual employee rests with the employee and his or her colleagues. Each employee is responsible for exercising the utmost care and good judgement in protecting his or her own health and safety, and that of fellow employees. Should any employee observe a potentially unsafe condition or situation, it is the responsibility of that employee to immediately bring the observed condition to the attention of the appropriate health and safety personnel.

Should an employee find himself or herself in a potentially hazardous situation, the employee shall immediately discontinue the hazardous procedure(s) and personally take appropriate preventative or corrective action, and immediately notify the Site Health and Safety Officer or Project Manager of the nature of the hazard. In the event of an immediately dangerous or life-threatening situation, the employee automatically has "stop work" authority.

1.3 Medical Surveillance and Training

All OU-2 RI/FS contractor and subcontractor personnel engaged in on-site activities for this project must have baseline physical examinations and be participants in an appropriate medical surveillance program. In addition, all on-site project personnel must be trained in recognition of potential hazards, hazardous waste site investigation health and safety protocol including respiratory protection, personal protective equipment, decontamination, and the proper use and

**OU-2 RI/FS WORK PLAN
APPENDIX B
SITE HEALTH AND SAFETY PLAN**

April 1995

4

Rev. 0
943-2848

calibration of appropriate air monitoring equipment, as described in Section 4.0. Documentation of participation in the medical surveillance program and training program must be provided for all personnel performing on-site activities.

1.4 Respiratory Protection

All employees who may be required to use air purifying respirators must be included in the above medical surveillance program and must be approved for the use of respiratory protection by a licensed physician. Prior to using any air purifying respirator in the field, each employee must be qualitatively fit-tested for the specific size, make, and model of the respirator he or she will be using, according to the procedures set forth in Appendix C of the 29 CFR 1910.1001 asbestos regulations. Beards (including a few day's growth), large sideburns, or mustaches which interfere with a proper respirator seal are not permitted.

1.5 General Procedures

The following personal hygiene and work practice guidelines are intended to prevent injuries and adverse health effects. These guidelines represent the minimum standard procedures for reducing potential risks associated with this project and are to be followed by OU-2 RI/FS contractor and subcontractor employees at all times.

- ▶ The "buddy system" will be used when conducting all field activities;
- ▶ A multipurpose dry chemical fire extinguisher, a complete field first aid kit, and a bottle of emergency eye wash solution will be immediately available to project field personnel. For example, field support vehicles will be stocked with these items when conducting drilling operations at locations remote from the site office;
- ▶ Eating, drinking, smoking, taking medications, chewing gum or tobacco, etc. is prohibited in the immediate vicinity of the drilling operation;

**OU-2 RI/FS WORK PLAN
APPENDIX B
SITE HEALTH AND SAFETY PLAN**

April 1995

5

Rev. 0
943-2848

- ▶ Do not handle potentially contaminated samples unless wearing appropriate nitrile butyl rubber, neoprene rubber, or latex rubber gloves;
- ▶ Thoroughly wash hands and, if necessary, face before eating or putting anything in your mouth (i.e., avoid hand-to-mouth contamination);
- ▶ Stand upwind of sample locations whenever possible;
- ▶ Be alert to potentially changing exposure conditions as evidenced by perceptible odors, unusual appearance of excavated soils, oily sheen on water, etc.;
- ▶ Be alert to the symptoms of fatigue and heat stress, and their effect on the normal caution and judgement of personnel;
- ▶ Establish prearranged hand signals or other means of emergency communication when wearing respiratory equipment, since this equipment seriously impairs speech communications;
- ▶ Noise may pose a health and safety hazard during drilling and construction activities. A good rule of thumb to follow is that if you have to shout in order to communicate a distance of 3 feet in steady state (continuous) noise, you should be wearing hearing protection. Likewise, any impact noise from activities such as driving casing during drilling which is loud enough to cause discomfort would also indicate the need for hearing protection; and,
- ▶ Always wear an appropriate level of personal protection. Lesser levels of protection can result in preventable exposure; excessive levels of safety equipment can impair efficiency and increase the potential for accidents to occur.

1.6 Site Control Procedures

All project personnel will sign in and out on a daily log at the West Lake Landfill office. Any visitors to the work site will be accompanied by authorized personnel.

**OU-2 RI/FS WORK PLAN
APPENDIX B
SITE HEALTH AND SAFETY PLAN**

April 1995

6

Rev. 0
943-2848

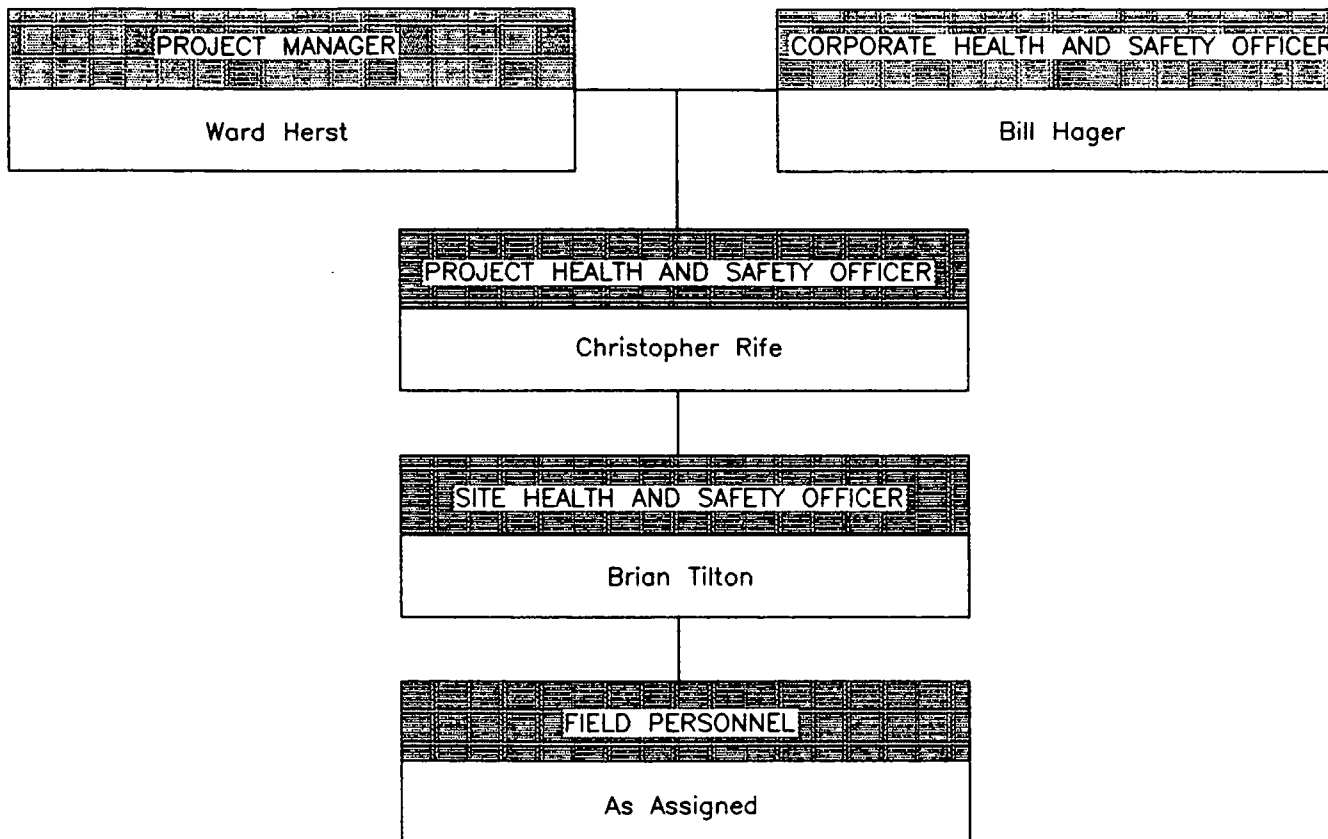
1.7 Site Safety Briefing

Prior to commencement of OU-2 field investigative activities at the West Lake Landfill, OU-2 RI/FS contractor and subcontractor field personnel will attend an on-site safety orientation. This orientation will include, at a minimum, the following topics:

- ▶ A discussion of the scope of work for the project;
- ▶ Locations of site emergency equipment and contacts;
- ▶ Personnel protective equipment requirements and action levels; and,
- ▶ Site safety procedures.

This briefing will be repeated for new employees and supported with weekly "tailgate" health and safety briefings. The weekly briefings will be conducted according to a schedule established by the Field Team Leader, and will be supplemented with additional briefings if site conditions change or are different than anticipated by this HSP.

All personnel in attendance must sign a safety briefing attendance sheet. No employee shall be permitted beyond the Clean/Decontamination zone boundaries until they have received and acknowledged such a briefing.



CLIENT/PROJECT

L A I D L A W
LAIDLAW WASTE SYSTEMS INC.

WEST LAKE (BRIDGETON)
OPERABLE UNIT 2



TITLE

**OU-2 RI/FS CONTRACTOR
HEALTH AND SAFETY PERSONNEL
AND CHAIN OF COMMAND**

DRAWN SMA CHECKED DER REVIEWED WEH

DATE APRIL 1995 SCALE NO SCALE FILE NO. 2848A051

JOB NO. 943-2848 DWG NO./REV.NO. A051 TABLE 1-1

**OU-2 RI/FS WORK PLAN
APPENDIX B
SITE HEALTH AND SAFETY PLAN**

April 1995

7

Rev. 0
943-2848

2.0 PROJECT DESCRIPTION

2.1 Project Objective

The primary objective of the West Lake Landfill OU-2 Remedial Investigation (RI) is to collect data on and near the site regarding contaminant characteristics, pathways, and transport mechanisms. Data from the RI will be evaluated during the Feasibility Study (FS) to determine the most feasible options for remediation.

2.2 Background Information

The West Lake Landfill is a 212-acre solid waste disposal facility that was originally operated as a limestone quarry from 1939 until 1987. Landfilling activities may have been initiated as early as 1952, although 1962 is generally cited as the beginning of waste disposal activities. Waste disposal was unregulated until 1974, and may have included industrial waste disposal prior to 1980. Radiological wastes were reportedly disposed of at the site in 1973. Sanitary and demolition waste disposal continues to date.

The site has been divided into two operable units. Operable Unit 1 (OU-1) is comprised of two areas encompassing the potential radiological disposal areas, and is not the subject of this HSP. Operable Unit 2 (OU-2) is comprised of the balance of the site, and is the subject of this HSP. A site map identifying the operable units and other site features is provided in Figure 2-1.

Previous environmental monitoring of soils, groundwater, surface water and sediments, and air indicates these media may have been impacted by site activities. Background information on the West Lake Landfill is provided in Section 2.0 of the OU-2 RI/FS Work Plan and summarized below.

**OU-2 RI/FS WORK PLAN
APPENDIX B
SITE HEALTH AND SAFETY PLAN**

April 1995

8

Rev. 0
943-2848

Soils

Few environmental investigations have characterized impacts to soils from historical activities within OU-2. Most investigations have been focused on radiological contamination within OU-1. Available information indicates that some limited migration of radiologically-contaminated materials into OU-2 may have occurred along the western portion of OU-1 Area 1 and Area 2. No available information indicates the presence of chemical contamination of soils. However, borehole drilling within the landfilled areas for leachate riser construction is likely to encounter materials which have been impacted by solid waste disposal, based on historical site activities.

Groundwater

Several previous investigations have characterized groundwater beneath the site. Available information indicates that impacts to alluvial groundwater have occurred, although concentrations of potentially hazardous chemicals are typically low and may be attributed to laboratory contamination. Distribution of detected volatile organic compounds and metals was generally described as irregular and could not be attributed to landfill impacts. Analysis of groundwater samples for radionuclides has indicated the presence of radionuclides above background levels, but below maximum permissible concentrations.

Surface Water and Sediments

Surface water and sediment sampling at the site has been limited. Available information does not indicate that impacts to the slough north of the site (see Figure 2-1) have occurred. Information about sampling and analysis of the Earth City industrial park stormwater retention pond (also depicted in Figure 2-1) was not identified in reviewed literature. Periodic sampling of the leachate retention pond indicates that concentrations of chemical substances are elevated

**OU-2 RI/FS WORK PLAN
APPENDIX B
SITE HEALTH AND SAFETY PLAN**

April 1995

9

Rev. 0
943-2848

above concentrations of these substances in natural surface water bodies or groundwater. However, the leachate retention pond will not be sampled or analyzed as part of the RI.

Air

Extensive air monitoring has been conducted at the site, both for ambient air and for the landfill gas collection system. Ambient air sampling and analysis included site worker dosimetry. Potentially hazardous airborne chemical compounds were not detected. Sampling and analysis for airborne radionuclides has focused on radon and radon daughters in air within OU-1. Results indicate that radionuclides are present at levels below health risk criteria. Sampling and analysis of the landfill gas collection system indicates that compounds present are within the range typically reported for municipal solid waste landfills.

Summary

These results indicate that certain chemical and radiological compounds are present within environmental media which will be encountered and/or sampled and analyzed as part of the OU-2 RI. Reported concentrations of these compounds are typically low (within the range normal for similar facilities) and do not exceed health criteria. Previous investigations have apparently not directly sampled and analyzed environmental media within the inactive, unregulated landfill areas. Accordingly, sampling activities within these areas likely present the greatest potential exposure hazard. The exposure limits and action identified in this Health and Safety Plan are intended to address health hazards reasonably anticipated to be present within these uncharacterized areas. Table 2-1 provides a list of chemical compounds potentially present at landfills, and their respective exposure limits.

**OU-2 RI/FS WORK PLAN
APPENDIX B
SITE HEALTH AND SAFETY PLAN**

April 1995

10

Rev. 0
943-2848

2.3 Health and Safety Plan Applicability

This Health and Safety Plan applies specifically to the field activities and laboratory analyses performed as part of remedial investigations in and near OU-2 of the West Lake Landfill. It has been prepared specifically for this RI/FS.

TABLE 2-1

CHEMICAL COMPOUNDS POTENTIALLY PRESENT ON-SITE

Substance	TWA Exposure Limit	IDLH Level	Health Effects
VOCs and SVOCs	> 1 ppm some carcinogens	> 100 ppm	Headache, lassitude, nausea, irritating to eyes, nose, throat, and/or skin.
Hydrogen Sulfide	10 ppm (NIOSH, OSHA) ST 15 ppm	300 ppm	Apnea, coma, convulsion, irritating to eyes, conjunctivitis, pain, lacrimation, photophobia, corneal vesiculation, irritating to respiratory system, dizziness, headache, fatigue, irritability, insomnia, gastrointestinal disturbance.
Methane	(N/A)	(N/A)	Simple asphyxiant.
Hydrogen Cyanide	ST 4.7 ppm (NIOSH, OSHA)	50 ppm	Asphyxia and death at high levels, weakness, headache, confusion, nausea, vomit, increased rate and depth of respiration, or respiration slow and gasping.

TWA: Time-weighted average (8-hour)
 VOC: Volatile organic compound
 SVOC: Semi-volatile organic compound
 PPM: Parts per million
 NIOSH: National Institute of Occupational Safety and Health
 OSHA: Occupational Safety and Health Administration
 STEL: Short term exposure limit
 N/A: Not applicable

Source: NIOSH, 1990



LEGEND

PERIMETER BERM

REV.	DATE	DESCRIPTION	DR. BY	APP. BY

CLIENT/PROJECT

Laidlaw
LAIDLAW WASTE SYSTEMS INC.

WEST LAKE LANDFILL
OPERABLE UNIT 2

TITLE

SITE FEATURES MAP

Denver, Colorado

Golder Associates

DRAWN	TMC	DATE	APRIL 1995
CHECKED	CER	SCALE	AS SHOWN
REVIEWED	WEH	JOB NO.	943-2848
APPROVED		DWG. NO.	D030
FILE NO.	2848D030	FIGURE	2 of 1

**OU-2 RI/FS WORK PLAN
APPENDIX B
SITE HEALTH AND SAFETY PLAN**

April 1995

11

Rev. 0
943-2848

3.0 SCOPE OF WORK AND POTENTIAL HAZARDS

A number of different field tasks will be performed as part of the RI at the West Lake Landfill. Each of the tasks has associated potential hazards. Recognition of the potential hazards is essential for preventing exposure to potentially harmful chemicals and for preventing worker injury.

3.1 Work Tasks

The site physical characterization field tasks identified for the RI are:

- ▶ Surficial Geologic Investigation;
- ▶ Piezometer/Monitor Well Installation;
- ▶ Water Level Monitoring;
- ▶ Aquifer Testing;
- ▶ Groundwater Sampling and Analysis;
- ▶ Surface Water, Stormwater, and Sediment Sampling and Analysis;
- ▶ Surface Soil Sampling and Analysis;
- ▶ Leachate Sampling and Analysis; and,
- ▶ Landfill Gas Characterization.

These tasks are summarized in Section 5.2 of the OU-2 RI/FS Work Plan, and described in detail in the OU-2 Field Sampling Plan. This HSP describes health and safety concerns associated with to these field tasks.

**OU-2 RI/FS WORK PLAN
APPENDIX B
SITE HEALTH AND SAFETY PLAN**

April 1995

12

Rev. 0
943-2848

3.2 Potential Hazards

A recent study by the National Safety Council indicated that the greatest risk to workers at hazardous waste sites is from traumatic injury from heavy equipment (such as drilling rigs or construction equipment) rather than from exposure to hazardous materials. Potential hazards anticipated at the West Lake Landfill include physical and chemical hazards, such as inhalation of hazardous vapors and dusts, absorption of chemicals through the skin, ingestion of chemicals, injury from falling objects during drilling activities, hearing loss during drilling activities, and weather related stress. To prevent these potential hazards from affecting worker performance, the Health and Safety Plan incorporates various levels of protection to be followed. However, it is recognized that guidelines to be followed can not replace worker common sense and experience.

3.3 Assessment and Mitigation of Potential Hazards

3.3.1 Inhalation

Inhalation of hazardous vapors is a potential hazard throughout RI field activities, although it is most likely to occur during borehole drilling for source characterization. Landfill gas monitoring at the West Lake Landfill has detected the presence of methane within the landfill. Other gases, such as hydrogen cyanide and hydrogen sulfide, are generally associated with municipal landfills. Release of these gases may occur during borehole drilling. Monitoring methods and levels of protection to be used during borehole drilling are described in Section 4.0 of this Health and Safety Plan.

**OU-2 RI/FS WORK PLAN
APPENDIX B
SITE HEALTH AND SAFETY PLAN**

April 1995

13

Rev. 0
943-2848

3.3.2 Absorption

Absorption of chemicals can occur whenever chemicals contact the skin or clothing of the worker. Absorption of chemicals is most likely to occur during sampling activities. To reduce the likelihood of absorption, all workers will be required to wear protective clothing as discussed in Section 5.0 of this Health and Safety Plan.

3.3.3 Ingestion

Ingestion of chemicals generally occurs only when workers do not follow proper decontamination procedures prior to eating. Section 7.0 of this Health and Safety Plan describes the decontamination procedures to be followed for the West Lake Landfill RI.

3.3.4 Injury From Falling Objects

Injury from falling objects, such as hammers, can occur whenever work activities are performed above the worker (e.g., on a drill rig). To prevent such injuries, all workers are required to wear protective head gear (i.e., hard hat) in the vicinity of overhead equipment or whenever overhead work is being performed.

3.3.5 Hearing Loss

Hearing loss can occur whenever the worker is exposed to excessive noise levels. To prevent this type of injury, all workers will be supplied with ear plugs to be worn when necessary. A good rule-of-thumb is that if workers must shout to be heard when standing only a few feet from each other, ear plugs should be used. Furthermore, all noise producing equipment (i.e., drill rigs) will be maintained in peak operating condition to reduce their noise levels.

**OU-2 RI/FS WORK PLAN
APPENDIX B
SITE HEALTH AND SAFETY PLAN**

April 1995

14

Rev. 0
943-2848

3.3.6 Weather Related Stress

Weather related stress can occur from both heat and cold, and can cause decreased motor skills and impaired judgement, which in turn can lead to injuries through impaired judgement or physical trauma.

3.3.6.1 Cold Stress

The American Conference of Governmental Industrial Hygienists (ACGIH) has developed threshold limit values (TLVs) in the form of work/warm up schedules for working in ambient air temperatures below -15°F. Because the climatological records from nearby St. Louis/Lambert International Airport indicate that temperature rarely falls below 0°F, the TLVs will likely not apply to the RI activities. However, the ACGIH has also developed criteria to describe exposures to cold working conditions under which nearly all workers can be repeatedly exposed without adverse health effects.

If work is performed continuously in an equivalent chill temperature of 20°F or less (see Table 3-1), workers will be encouraged to use heated warming shelters at regular intervals, the frequency depending on the severity of the environmental exposure. When entering the heated shelter, the outer layer of clothing will be removed and the remainder of the clothing loosened to permit sweat evaporation. Workers will be encouraged to drink warm liquids to prevent dehydration, although the intake of coffee or other caffeinated beverages should be limited.

For work activities at or below an equivalent chill temperature of 10°F, workers will be under constant supervision and heavy sweating must be avoided. All workers will be trained in:

- ▶ Proper rewarming procedures;
- ▶ Appropriate first aid treatments;

**OU-2 RI/FS WORK PLAN
APPENDIX B
SITE HEALTH AND SAFETY PLAN**

April 1995

15

Rev. 0
943-2848

- ▶ Proper clothing practices;
- ▶ Proper eating and drinking habits;
- ▶ Recognition of impending frostbite;
- ▶ Recognition signs and symptoms of impending hypothermia; and
- ▶ Safe work practices.

Tinted eye protection for all workers will be provided when a glare potential (snow or ice) is present. Air temperature and wind speed monitoring and recording are required every 4 hours when the temperature falls below 30°F.

3.3.6.2 Heat Stress

Experience has shown that the most effective heat stress deterrent is worker awareness and physiological monitoring. When working in Level C or B protection in ambient temperatures greater than 65°F, employees will use the "buddy system" to monitor each other's pulse rate at the start of each rest period. If the pulse rate exceeds 110 beats per minute, the employee will take his or her oral temperature with an colorimetric disposable oral thermometer. If the oral temperature exceeds 99.6°F, the next work period shall be shortened by one-third. The pulse rate and oral temperature shall be monitored again at the beginning of the next rest period; and if the oral temperature exceeds 99.6°F, the work period shall again be shortened by one-third etc., until the oral temperature is below 99.6°F.

All employees are to be alert to the possibility and symptoms of heat stress. Should any of the following symptoms occur: extreme fatigue, cramps, dizziness, headache, nausea, profuse sweating, or pale clammy skin, the employee is to leave the work area, rest, cool off, and drink

**OU-2 RI/FS WORK PLAN
APPENDIX B
SITE HEALTH AND SAFETY PLAN**

April 1995

16

Rev. 0
943-2848

plenty of water/Gatorade/Squencher, etc. If the symptoms do not subside after a reasonable rest period, the employee shall notify the RI/FS Contractor Project Manager or on-site Health and Safety Officer and seek medical assistance.

TABLE 3-1
WIND CHILL FACTORS

Estimated Wind Speed (mph)	Actual Temperature Reading (°F)											
	50	40	30	20	10	0	-10	-20	-30	-40	-50	-60
	Equivalent Chill Temperature (°F)											
calm	50	40	30	20	10	0	-10	-20	-30	-40	-50	-60
5	48	37	27	16	6	-5	-15	-26	-36	-47	-57	-68
10	40	28	16	4	-9	-24	-33	-46	-58	-70	-83	-95
15	36	22	9	-5	-18	-32	-45	-58	-72	-85	-99	-112
20	32	18	4	-10	-25	-39	-53	-67	-82	-96	-110	-121
25	30	16	0	-15	-29	-44	-59	-74	-88	-104	-118	-133
30	28	13	-2	-18	-33	-48	-63	-79	-94	-109	-125	-140
35	27	11	-4	-20	-35	-51	-67	-82	-98	-113	-129	-145
40	26	10	-6	-21	-37	-53	-69	-85	-100	-116	-132	-148
(Wind speeds greater than 40 mph have little additional effect.)	LITTLE DANGER In < hr with dry skin. Maximum danger of false sense of security.				INCREASING DANGER Danger from freezing of exposed flesh within one minute.				GREAT DANGER Flesh may freeze within 30 seconds.			
	Trenchfoot and immersion foot may occur at any point on this chart.											

Source: ACGIH, 1993

**OU-2 RI/FS WORK PLAN
APPENDIX B
SITE HEALTH AND SAFETY PLAN**

April 1995

17

Rev. 0
943-2848

4.0 SITE MONITORING AND ACTION LEVELS

As described in the main text of the RI/FS Work Plan, boreholes will be installed at locations within and around the perimeter of the landfill during source, physical, and contaminant characterization. Toxic and explosive vapor monitoring described in the following sections will be performed in all boreholes drilled in areas with a potential for the presence of hazardous airborne substances. Certain boreholes will be drilled in clustered locations. Air monitoring at cluster locations will be required in the first borehole. If air monitoring at the first location does not detect any compounds, subsequent drilling to shallower depths at that cluster will not require air monitoring. Any readings above background during drilling the first borehole, or drilling to deeper (previously unmonitored) depths, will require continued air monitoring.

All health and safety air monitoring readings will be recorded in field notebooks and will include the date, time, weather conditions, wind direction, and location of the reading. In addition, on a daily basis background readings will be measured in an area distant from areas of potential contamination.

Prior to initiation of drilling, all utilities will be clearly staked by utility representatives. During drilling, workers will be aware of the location of overhead lines as well as any changes in drilling that might indicate the presence of a buried utility line. If it is believed that a utility line has been drilled into, drilling should immediately cease and the Site Health and Safety Officer will be notified.

The following paragraphs describe air monitoring for combustible gases, hydrogen sulfide and hydrogen cyanide, volatile organic compounds, and radionuclides. Action level information provided below is summarized in Table 4-1.

**OU-2 RI/FS WORK PLAN
APPENDIX B
SITE HEALTH AND SAFETY PLAN**

April 1995

18

Rev. 0
943-2848

4.1 Combustible Gases

Methane gas generated by the decomposition of organic matter is commonly associated with invasive work on sanitary landfills. Drilling through refuse can pose a fire and explosion hazard. Combustible gas monitoring will be performed when drilling all boreholes.

An oxygen, combustible gas, and hydrogen sulfide detector will be used to monitor combustible gas concentrations. The instrument calibration will be checked daily. For example, a combustible gas indicator (CGI) may be calibrated to pentane. The calibration may be checked by introducing methane calibration gas consisting of 2.5 percent methane and 17 percent oxygen in a balance of nitrogen. This mixture can also be used to check the oxygen detector. The instrument should read between 47 percent and 53 percent LEL (Lower Explosive Limit) if it is calibrated directly to methane, and between 16 percent and 18 percent oxygen.

The LEL concentration (the lowest concentration at which a gas becomes explosive in air) is between 1 percent and 7 percent for most "combustible" organic vapors and gases. This corresponds to a concentration of 10,000 to 70,000 parts per million (ppm) by volume in air. The LEL concentration of pentane for example is 1.5 percent or 15,000 ppm in air. Consequently, 50 percent LEL of pentane is equivalent to 7,500 ppm. At such concentrations most flammable gases can be detected by the sense of smell. Methane and hydrogen are notable exceptions.

Methane and hydrogen are both odorless, tasteless, colorless and extremely flammable gases. Since the likelihood of finding explosive concentrations of molecular hydrogen on a landfill is extremely remote, high combustible gas readings in the absence of distinctive odors strongly suggest the presence of methane.

**OU-2 RI/FS WORK PLAN
APPENDIX B
SITE HEALTH AND SAFETY PLAN**

April 1995

19

Rev. 0
943-2848

Photoionization detectors (PIDs) which can detect organic vapors in ppm concentrations, respond very poorly to methane, if at all.

It is a common misconception that since PIDs do not "see" methane, they can be used to effectively "screen out" high concentrations of methane and detect ppm concentrations of other more toxic organic vapors and gases such as benzene and vinyl chloride. In fact, while methane molecules do not ionize upon interaction with an 11.7 eV photon, they interact nevertheless (i.e., absorb UV photons), and effectively "quench" the detection of any other organics present at much lower concentrations. A hand-held PID cannot detect trace concentrations of volatile organic vapors in the presence of methane at the concentrations commonly associated with landfill gases. A combustible gas indicator is, in fact, the only reliable real-time detector of organic gases and vapors in a landfill environment.

Municipal landfill gases are typically comprised of 40 to 60 percent methane, with a balance of carbon dioxide, nitrogen, oxygen, water vapor, and perhaps H_2S , and rarely contain more than 500 ppm of other trace gases and vapors. Recent sampling of both landfill gases directly from the gas extraction system and personal sampling of landfill workers' breathing zones indicate that the West Lake Landfill site is no exception.

Given that the concentration of trace gases in the landfill gas itself can be assumed to be less than 1000 ppm, and that the LEL of methane is 5 percent by volume in air (i.e., 100% LEL), a reading of 10 percent LEL on the CGI can be interpreted as a corresponding total trace gas concentration of 10 ppm with a considerable safety factor.

The CGI will be used to monitor the work area for combustible gas levels and volatile organic compounds. Steady-state readings in the immediate work area in excess of 10 percent LEL shall be the action level for donning half-face air purifying respirators equipped with combination acid gas-organic vapor (yellow) cartridges.

**OU-2 RI/FS WORK PLAN
APPENDIX B
SITE HEALTH AND SAFETY PLAN**

April 1995

20

Rev. 0
943-2848

Readings of 10 percent LEL also demand increased vigilance, extreme caution, and a careful assessment of overall conditions for potential explosion hazards. Readings in excess of 50 percent LEL 1 to 2 feet above (and slightly downwind of) the mouth of the borehole or 25 percent LEL in the work area shall be the action level to temporarily cease operations and evacuate the exclusion zone. Such conditions may require active corrective measures such as general site ventilation, passive measures (i.e., allowing the hole to vent), or as a last resort, abandoning the hole.

4.2 Hydrogen Sulfide and Hydrogen Cyanide

An additional cause for concern when methane gas is venting from the hole is that it may "purge" other much more acutely toxic gases such as hydrogen sulfide or hydrogen cyanide out of the hole along with it.

Hydrogen sulfide concentrations will be monitored on the direct reading H₂S instrument concurrently with combustible gas measurements. Calibration of the hydrogen sulfide detector must be checked prior to each day of use by introducing a 10 ppm H₂S calibration gas. Instrument readings must be 9-11 ppm when introducing 10 ppm H₂S. If not, open the side of the MSA 361 and adjust the "TOX SPAN" to 10 ppm.

The H₂S detector is very non-linear and must periodically be checked with 25 to 40 ppm H₂S. After calibrating the instrument to 10 ppm H₂S, introduce 25 or 40 ppm H₂S calibration gas. If the instrument does not read within plus or minus 20 percent of the calibration gas concentration, do not use the instrument and replace the H₂S detector as soon as possible.

According to the ACGIH (1993), the 8-hour time weighted average threshold limit value (TLV) for hydrogen sulfide is 10 ppm and the 15 minute short term exposure limit (STEL) is 15 ppm.

**OU-2 RI/FS WORK PLAN
APPENDIX B
SITE HEALTH AND SAFETY PLAN**

April 1995

21

Rev. 0
943-2848

The National Institute for Occupational Safety and Health (NIOSH) states that the Immediately Dangerous to Life or Health (IDLH) level for hydrogen sulfide is 300 ppm.

If H₂S concentrations greater than 10 ppm are detected at the mouth of the borehole, the monitoring frequency shall be increased and/or the H₂S instrument can be set up to run continuously at the driller's operating position.

At concentrations of a few ppm in the breathing zone, the "rotten egg" odor associated with hydrogen sulfide would be such that site personnel would voluntarily don air purifying respirators. Such use of air purifying respirators is perfectly acceptable but once air purifying respirators are donned, H₂S concentrations must be monitored continuously.

If concentrations in the breathing zone exceed 15 ppm for 15 minutes, work shall be temporarily halted until H₂S levels subside or until site personnel are equipped with pressure demand air supplying respirators.

If there is any evidence that gas is actively venting from the hole, the Site Health and Safety Officer will periodically monitor for the presence of hydrogen cyanide using HCN colorimetric detector tubes while standing upwind of the borehole. The TLV for hydrogen cyanide is a ceiling limit of 10 ppm. The IDLH concentration is around 50-60 ppm.

If HCN concentrations greater than 5 ppm are detected at the mouth of the borehole, the monitoring frequency shall be increased to at least every 15 minutes until two consecutive readings are below 5 ppm. Site personnel should make a conscientious effort to stand upwind of the hole. If the level at the mouth of the hole is greater than the 10 ppm ceiling limit, the Site Health and Safety Officer shall momentarily cease operations and determine the HCN concentrations in the breathing zone, and at 15 minute intervals thereafter. If HCN concentrations greater than 1 ppm are detected in the breathing zone immediately downwind of

**OU-2 RI/FS WORK PLAN
APPENDIX B
SITE HEALTH AND SAFETY PLAN**

April 1995

22

Rev. 0
943-2848

the hole at any time, or if levels greater than 25 ppm are detected at the mouth of boreholes, drilling activities shall be immediately halted until HCN levels subside or until site personnel are equipped with pressure demand air supplying respiratory protection.

4.3 Volatile Organic Compound Monitoring

A municipal landfill may contain isolated quantities of a variety of potentially hazardous substances. Substances that are of most concern from an inhalation standpoint are those that are relatively volatile and are moderately to highly toxic, having odor thresholds higher than the corresponding TLV. Many organic solvents fall into this category.

The designated Site Health and Safety Officer shall have a photoionization detector such as the Mini-RAE™ or Thermo Environmental™ Organic Vapor Monitor (OVM), to conduct air monitoring when drilling source characterization boreholes. A background level must be established well upwind of the borehole. If the exact nature of the contaminant(s) is unknown, any consistent readings in the breathing zone that are perceptibly above the upwind background level for more than 5 minutes, any readings in the breathing zone greater than 5 ppm other than a momentary peak, or any peak reading greater than 10 ppm shall be the action level for donning half face air purifying respirators equipped with organic vapor acid gas cartridges.

Given the rapid breakthrough time of some substances such as vinyl chloride, cartridges will be replaced after each day of use or immediately upon any indication of "break through," whichever is less.

Any readings consistently greater than 10 ppm above background for 5 minutes, greater than 25 ppm other than for a brief peak, or any peak reading greater than 50 ppm in the breathing zone will be the action level for either temporarily discontinuing work, upgrading the level of respiratory protection to full face cartridge respirators if the contaminants are known and the full

**OU-2 RI/FS WORK PLAN
APPENDIX B
SITE HEALTH AND SAFETY PLAN**

April 1995

23

Rev. 0
943-2848

face respirator will provide an adequate level of protection, or upgrading to Level B respiratory protection (SCBAs) as appropriate.

4.4 Radionuclides

As previously discussed, radiological materials may have been deposited within the area of the site designated as OU-1. The field activities conducted for the OU-2 RI/FS will generally not involve exposure to potential radiologically-contaminated materials. However, borehole drilling, piezometer/monitoring well installation, and groundwater sampling in the vicinity of OU-1 Area 1 will be conducted while monitoring for radiological contamination with a Geiger counter. During borehole drilling in the vicinity of OU-1 Area 1 (PZ-113 cluster, PZ-114, and PZ-115), downhole equipment will be monitored upon retrieval from the hole to identify the presence of radiological contamination. Any readings above background levels will require utilization of "as low as reasonably achievable" (ALARA) principles to minimize exposure to radiation. ALARA principles are:

- ▶ Minimize the duration of exposure to radiation;
- ▶ Increase the distance between the worker and the radiation source (radiation strength decreases according to the inverse square law); and,
- ▶ Maintain proper hygiene, especially in dusty conditions.

Based on previous investigations, the rate of gamma exposure at the site is negligible. Alpha exposure from uranium and radium (alpha emitters), which attracts to dust particles, presents a potential ingestion and/or inhalation hazard. Accordingly, maintaining proper hygiene practices, including washing face and hands prior to eating, drinking, or smoking is essential. Additionally, air purifying respirators with dust filters (at a minimum) should be donned whenever a dust hazard is present.

**OU-2 RI/FS WORK PLAN
APPENDIX B
SITE HEALTH AND SAFETY PLAN**

April 1995

24

Rev. 0
943-2848

Boreholes displaying elevated radiological readings will be identified for future reference. Piezometer/monitoring well construction, and groundwater level monitoring and sample collection, at these wells will be conducted in Level C PPE, as described above.

TABLE 4-1

AIR MONITORING ACTION LEVELS

Instrument	Parameter	Action Level	Specific Action
Combustible Gas Indicator (CGI)	Methane Gas	10% LEL in breathing zone 25% LEL at depth 25% LEL 1 foot above hole or casing, or 25% LEL in work zone	Increased monitoring Upgrade to Level C PPE Temporarily cease operations
H ₂ S Detector	Hydrogen Sulfide Gas	> 10 ppm at mouth of borehole "Rotten egg" smell > 15 ppm for more than 15 minutes in breathing zone	Increased monitoring Upgrade to Level C PPE Monitor continuously Temporarily cease operations
Colorimetric Detector Tubes	Hydrogen Cyanide	> 5 ppm at mouth of borehole > 10 ppm at mouth of borehole > 1 ppm breathing zone OR > 25 ppm at mouth of borehole	Increased monitoring Temporarily cease operations Halt operations; Upgrade to Level C PPE
Photoionization Detector (PID)	Volatile Organic Compounds	Above background in breathing zone for more than 5 minutes OR > 5 ppm in breathing zone (other than a peak) OR > 10 ppm peak > 10 ppm above background in breathing zone OR > 25 ppm other than a brief peak OR > 50 ppm peak	Upgrade to Level C PPE Temporarily cease operations
Geiger Counter	Radionuclides	Above background	Minimize duration of exposure Increase distance from source Utilize shielding

LEL: Lower Explosive Limit

PPM: Parts per million

PPE: Personal Protective Equipment

**OU-2 RI/FS WORK PLAN
APPENDIX B
SITE HEALTH AND SAFETY PLAN**

April 1995

25

Rev. 0
943-2848

5.0 PERSONAL PROTECTIVE CLOTHING AND RESPIRATORY PROTECTION

5.1 Personal Protective Equipment

Personal protective equipment (PPE) will be worn whenever conducting field activities as part of the OU-2 RI. The basic work uniform (Level D) will consist of standard work clothes (including long pants and shirt sleeves), with steel-toed boots (chemical-resistant if working in areas with potential chemical exposures), safety glasses, and hard hat. The basic work uniform may be upgraded with the addition of disposable waterproof chemical-resistant coveralls (such as poly-coated Tyvek™ or Saranex™) and chemical-resistant gloves when a splash hazard exists. If respiratory protection is appropriate, donning a half-face or full-face air purifying respirator (APR) constitutes an upgrade to Level C protection. Additional respiratory protection is afforded by the use of self-contained breathing apparatus (SCBAs), as Level B PPE. Further chemical protection provided by Level A fully encapsulating suits are not anticipated to be required at this site.

5.2 Levels of Protection for RI Field Tasks

The following paragraphs identify PPE requirements for conducting each RI field task. This information is also provided in Table 5-1.

5.2.1 Surficial Geologic Investigation

The standard work uniform (Level D) is appropriate for conducting the surficial geologic investigation.

**OU-2 RI/FS WORK PLAN
APPENDIX B
SITE HEALTH AND SAFETY PLAN**

April 1995

26

Rev. 0
943-2848

5.2.2 Piezometer/Monitoring Borehole Drilling and Well Construction

At a minimum, Level D protection will be used during borehole drilling unless health and safety air monitoring indicates respiratory protection should be upgraded to Level C. Chemical-resistant coveralls (polycoated Tyvek™ or Saranex™) will be worn when drilling in saturated materials (i.e., a splash hazard is present). Chemical-resistant gloves shall be worn whenever it is necessary to contact or handle waste, groundwater, or any other potentially contaminated implements or materials.

5.2.3 Groundwater Sample Collection

All groundwater sampling will be performed under Level D protection, with chemical-resistant coveralls such as polycoated Tyvek™ or Saranex™ used to prevent dermal contact. If windy conditions exist, Level C will be appropriate to prevent inhalation of wind-blown particles.

5.2.4 Surface Water/Sediment Sampling

Surface water and sediment sampling will be conducted in Level D PPE with chemical-resistant disposable coveralls such as polycoated Tyvek™ or Saranex™. If samples will be collected from surface water bodies from a boat, life jackets will be worn when in the boat.

5.2.5 Surface Soil Sample Collection

Level D protection will be sufficient for surface soil sampling, unless air monitoring or wind-blown dust indicate upgrading the level of protection to Level C.

OU-2 RI/FS WORK PLAN
APPENDIX B
SITE HEALTH AND SAFETY PLAN

April 1995

27

Rev. 0
943-2848

5.2.6 Leachate Riser Borehole Drilling, Well Construction, and Sampling

Level D protection with chemical-resistant disposable coveralls such as Tyvek™ or Saranex™ is appropriate when conducting leachate riser borehole drilling, well construction, and leachate sampling activities. Field personnel are required to have an APR immediately accessible, should air monitoring indicate that upgrading respiratory protection to Level C is appropriate.

5.2.7 Landfill Gas and Soil Gas Sample Collection

At a minimum, Level D protection with chemical-resistant disposable coveralls such as Tyvek™ or Saranex™ is required when conducting landfill gas and soil gas sampling. Field personnel are required to have an APR immediately available, should air monitoring indicate that upgrading respiratory protection to Level C is appropriate.

5.2.8 Aquifer Testing

Aquifer testing procedures will be conducted in Level D PPE, with chemical-resistant disposable coveralls such as Tyvek™ or Saranex™ worn during portions of the procedures with a splash hazard. Air monitoring indicating a need for respiratory protection will require an upgrade to Level C PPE (air purifying respirators).

5.2.9 Other Tasks

All remaining RI tasks not involving sampling, such as water well survey, biota evaluation, hydraulic head measurements, etc., are to be conducted using Level D protection unless field situations indicate that a higher level of protection is warranted.

TABLE 5-1**PPE REQUIREMENTS PER TASK**

Task	Personal Protective Equipment
Surficial Geologic Investigation	Level D.
Piezometer/Monitoring Well Borehole Drilling and Well Construction	Level D, with polycoated Tyvex™ or Saranex™ if a splash potential exists, with upgrade to Level C if required by air monitoring.
Groundwater Sample Collection	Level D, with polycoated Tyvex™ or Saranex™ if a splash potential exists, with upgrade to Level C if required by air monitoring.
Surface Water/Sediment Sampling	Level D.
Surface Soil Sample Collection	Level D, with upgrade to Level C if required by air monitoring.
Leachate Riser Borehole Drilling, Well Construction, and Sampling	Level D, with polycoated Tyvex™ or Saranex™ if a splash potential exists, with upgrade to Level C if required by air monitoring.
Landfill Gas and Soil Gas Sample Collection	Level D, with polycoated Tyvex™ or Saranex™ if a splash potential exists, with upgrade to Level C if required by air monitoring.
Aquifer Testing	Level D, with polycoated Tyvex™ or Saranex™ if a splash potential exists.

**OU-2 RI/FS WORK PLAN
APPENDIX B
SITE HEALTH AND SAFETY PLAN**

April 1995

28

Rev. 0
943-2848

6.0 SITE CONTROL

Access to active working areas will be limited by creating various zones or areas surrounding the work areas. For example, a 20-foot diameter exclusion zone will be established around each borehole drilling location. The zone will be marked with hazard warning tape, barriers, or safety cones. These are to be designated as the exclusion zone, the decontamination area, and the support area.

Those workers entering the exclusion zone must be wearing the proper level of protection. When leaving the exclusion zone, the workers shall immediately go to the decontamination area and decontaminate the equipment, after which they may remove their potentially contaminated protective clothing (e.g., gloves, Tyvek™, etc.). After full decontamination, the workers may leave the decontamination area and enter the support area. The support area will contain protective clothing, respirators, decontaminated equipment, etc. for use in subsequent activities.

**OU-2 RI/FS WORK PLAN
APPENDIX B
SITE HEALTH AND SAFETY PLAN**

April 1995

29

Rev. 0
943-2848

7.0 DECONTAMINATION PROCEDURES

7.1 Equipment Decontamination

Upon entering the decontamination area, potentially contaminated equipment such as drill pipe, bits, etc., will be decontaminated using appropriate cleaning solutions such as Liquinox™. All rinse waters will be collected in a sump for subsequent disposal. After decontamination, all equipment will be placed on clean plastic to prevent contact with potentially contaminated soil.

7.2 Personnel Decontamination

Personnel decontamination will be performed only after completely decontaminating the equipment. Personnel decontamination will follow the steps outlined below; it should be noted that the following PPE may not be worn in every situation:

- ▶ Wash outer gloves;
- ▶ Rinse outer gloves;
- ▶ Remove outer gloves;
- ▶ Wash outer protective clothing (e.g., Tyvek™, Saranex™);
- ▶ Rinse outer protective clothing;
- ▶ Remove outer protective clothing;
- ▶ Wash inner gloves;
- ▶ Rinse inner gloves;
- ▶ Remove and decontaminate respirator (if used); and,
- ▶ Remove inner gloves.

**OU-2 RI/FS WORK PLAN
APPENDIX B
SITE HEALTH AND SAFETY PLAN**

April 1995

30

Rev. 0
943-2848

Under no circumstances are respirators to be removed prior to decontaminating all other equipment and protective clothing.

7.3 Respiratory Protection Equipment Decontamination

Respirators (if used) shall be decontaminated by first wiping off the outer face shield with cleansing solution with the worker still wearing his/her respirator. After cleaning the outer portion of the respirator, it can be removed and the inner portion cleaned to remove perspiration. When not in use, decontaminated respirators are to be positioned so that the outer face shield faces upwards, preventing settling particles from falling into the inner portion of the respirator.

7.4 Heavy Equipment Decontamination

All heavy equipment shall be decontaminated prior to leaving the site. Decontamination procedures are outlined in Attachment A.

**OU-2 RI/FS WORK PLAN
APPENDIX B
SITE HEALTH AND SAFETY PLAN**

April 1995

31

Rev. 0
943-2848

8.0 CONTINGENCY AND EMERGENCY RESPONSE PLANS

The following procedures have been established to deal with emergency situations that might occur during drilling or sampling operations. Project field personnel should familiarize themselves with the location of the nearest phone and medical facilities. In the event of an emergency situation, project field personnel shall follow the procedures specified below. When help arrives, RI/FS Contractor employees shall defer all emergency response authority to appropriate responding agency personnel.

If an unanticipated, potentially hazardous situation arises as indicated by instrument readings, visible contamination, unusual or excessive odors, etc., project field personnel shall temporarily cease operations, move away to a safe area, and contact the Contractor Health and Safety Coordinator. In the event of a serious emergency situation, project field personnel shall contact the local fire department or paramedics, as appropriate, and inform them of the nature of the emergency, and then notify RI/FS Contractor health and safety personnel.

The nearest telephones are at the Golder site office or the West Lake Landfill entrance station. Emergency response telephone numbers are as follows:

Hospital:	De Paul Health Center
Address:	12303 De Paul Drive Bridgeton, Missouri
Telephone:	344-6000
Ambulance:	911
Fire:	911
Police:	911

OU-2 RI/FS WORK PLAN
APPENDIX B
SITE HEALTH AND SAFETY PLAN

April 1995

32

Rev. 0
943-2848

Directions to De Paul Health Center from the West Lake Landfill

From site entrance at St. Charles Rock Road:

Proceed east approximately 1.5 miles on St. Charles Rock Road. Turn south on McKelvey Road. Follow McKelvey Road south for about 0.25 miles. Turn west at De Paul Drive (follow signs).

Figure 8-1 illustrates the route to the hospital from the site.

8.1 Medical Emergency Response Plan

Employees shall have walkie-talkies or CB radios on site, or be within the immediate vicinity of a previously located working telephone, at all times. Employees should familiarize themselves with the location of the nearest phone and medical facilities. In the event of an emergency situation, employees shall follow the general procedures specified below. Specific emergency procedures must be either posted at the work location or available in the vehicle.

Should any person visiting or working at the site be injured or become ill, notify the on-site Health and Safety Officer and initiate the following emergency response plan:

Note: The nature of chemical contamination on this project does not present an immediate threat to human health. Other than removal of outer protective garments and gross contamination (i.e., mud), immediate emergency treatment of injuries should take precedence over personal decontamination.

1. If able, the injured person should proceed to the nearest available source of first aid. If the injured party is extremely muddy, remove outer garments and if necessary, wash the injured area with soap and water. If the "injury" involves a potential overexposure to hazardous gases or vapors, (headache, dizziness, nausea, disorientation), get the victim to fresh air and take him or her to a doctor for a complete physical examination as soon as possible.

**OU-2 RI/FS WORK PLAN
APPENDIX B
SITE HEALTH AND SAFETY PLAN**

April 1995

33

Rev. 0
943-2848

If the injury involves foreign material in the eyes, immediately flush the eyes with emergency eye wash solution and rinse with copious amounts of water at the nearest emergency eye wash station. Obtain or administer first aid as required. If further medical treatment is required, seek medical assistance as discussed below.

2. If the victim is unable to walk, but is conscious and there is no evidence of spinal injury, escort or transport the injured person to the nearest first aid facility. If the victim cannot be moved without causing further injury such as in the case of a severe compound fracture, take necessary emergency steps to control bleeding and immediately call for medical assistance as discussed below.

If the victim is unconscious or unable to move, Do Not Move The Injured Person Unless Absolutely Necessary To Save His Or Her Life, until the nature of the injury has been determined.

If there is any evidence of spinal injury do not move the victim unless absolutely necessary to save his or her life. Administer rescue breathing if the victim is not breathing, control severe bleeding and immediately seek medical assistance.

8.2 Fire and Explosions

Dry chemical fire extinguishers are effective for fires involving ordinary combustibles such as wood, grass, etc., flammable liquids, and electrical equipment. They are appropriate for small, localized fires such as a drum of burning refuse, a small burning gasoline spill, a vehicle engine fire, etc. No attempt should be made to use the provided extinguishers for well established fires or large areas or volumes of flammable liquids.

Regarding fire, prevention is the best contingency plan. There should be no smoking in the vicinity of a well-head and smoking materials where permitted should be extinguished with care.

**OU-2 RI/FS WORK PLAN
APPENDIX B
SITE HEALTH AND SAFETY PLAN**

April 1995

34

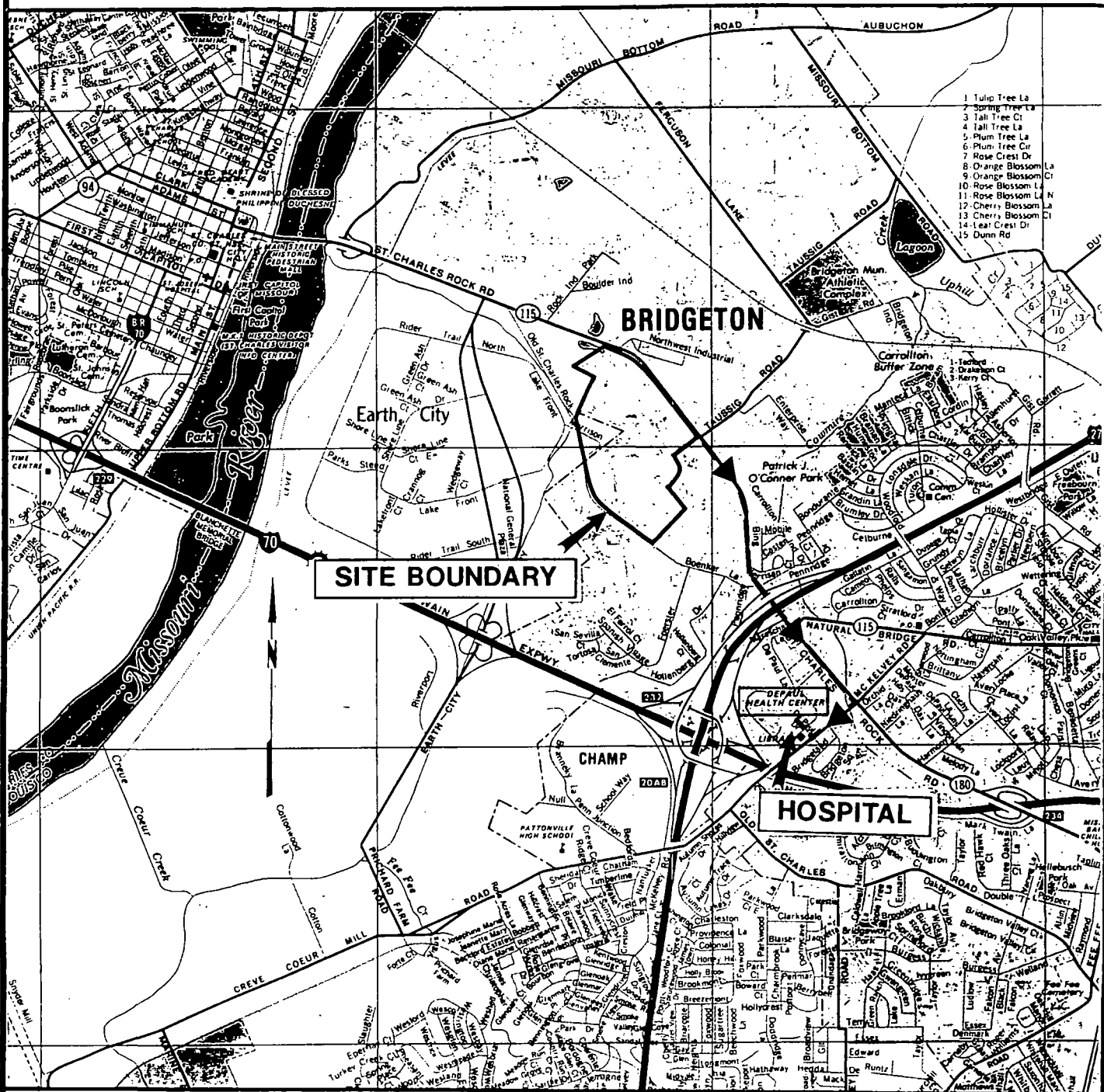
Rev. 0
943-2848

In the event of a fire or explosion:

1. If the situation can be readily controlled with available resources without jeopardizing the health and safety of yourself or other site personnel, take immediate action to do so. If not:
2. Isolate the fire to prevent spreading if possible.
3. Clear the area of all personnel working in the immediate vicinity.
4. Immediately notify site emergency personnel and the local fire department.

8.3 Unforeseen Circumstances

The Health and Safety procedures specified in this plan are based on the best information available at the time. Unknown conditions may exist, and known conditions may change. This plan can not possibly account for every unknown or anticipate every contingency. Should substantially higher levels of contamination be encountered in the soil or groundwater, or should any situation arise which is obviously beyond the scope of the monitoring, respiratory protection, and decontamination procedures specified herein, work activities shall be modified (such as moving to another location) or halted pending discussion with the RI/FS Contractor Health and Safety Coordinator and implementation of appropriate protective measures.



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SCALE IN MILES



Golder Associates

Denver, Colorado

CLIENT/PROJECT

LAWLAW
LAWLAW WASTE SYSTEMS INC.

**WEST LAKE LANDFILL
OPERABLE UNIT 2**

TITLE

ROUTE TO HOSPITAL

DRAWN

BDL

DATE

APRIL 1995

JOB NO.

943-2848.201

CHECKED

CER

SCALE

AS SHOWN

DWG NO./REV. NO.

REVIEWED

WEH

FILE NO.

FIGURE NO.

8-1

ATTACHMENT A
EQUIPMENT DECONTAMINATION PROTOCOL

**OU-2 RI/FS WORK PLAN
APPENDIX B
SITE HEALTH AND SAFETY PLAN
ATTACHMENT A**

April 1995

1

943-2848

All equipment, tools and materials used in drilling, well installation and well development shall be decontaminated (cleaned) before being used at any hole or well on site and between holes or wells on site. Water used for decontamination shall be stored, pumped or otherwise maintained so that it remains free of deleterious substances.

1. The condition of the equipment shall be such that contamination is not created. Leaking seals or leaking tanks containing fluids other than water shall not be permitted.
2. Water used for decontamination shall be from a municipal water supply or other uncontaminated source.
3. All equipment shall be degreased upon arrival at the site. Any lubrication of equipment after degreasing will be with vegetable oil.
4. Cleaning operations, including disposal of fluids and trash generated, will be done in accordance with the site's safety procedures and material handling policies.
5. The drill rig and excavation equipment shall be steam cleaned utilizing municipal water or other uncontaminated source prior to use. Steam cleaning units operated using compressed air shall be equipped with operable oil traps and a filter. The name, model and serial number of the steam cleaning unit shall be recorded.
6. Drill rod, augers, casing, soil samplers, pipe wrenches, etc., shall be placed on horses or other supports and cleaned until all visible signs of grease, oil, mud, etc., are removed. Brushes shall be used as required.
7. Latex gloves or new clean cotton work gloves shall be used for handling cleaned equipment.
8. Clean hose shall be used for transferring the cleaning water. Water tanks, pumps and mud pans, including tanks used to transfer water from source to drill rig tank (e.g. pickup truck water tanks) shall be clean.
9. Petroleum-based lubricants shall not be used. Fittings on the drilling equipment may be lubricated with vegetable oil and fluids may be added to the equipment with care after cleaning.
10. Only cement in bags, powdered or granulated bentonite in bags, and bentonite pellets in sealed containers shall be used. All materials shall be free of additives.

**OU-2 RI/FS WORK PLAN
APPENDIX B
SITE HEALTH AND SAFETY PLAN
ATTACHMENT A**

April 1995

2

943-2848

11. Riser pipe and well screen will be provided in a cleaned condition. Workers shall use clean cotton gloves or new latex gloves when handling riser pipe and well screen.
12. Riser pipe, well screen and other materials for well construction shall be stored in such a manner to prevent damage or contamination.
13. The protective casing and any other casing pipe used shall be steam cleaned.
14. Boreholes shall not be left open for extended periods of time or during periods of precipitation. The boreholes shall be covered with plastic on these occasions to protect the inside of the well bore from contamination.